



Marital discord, past depression, and metabolic responses to high-fat meals: Interpersonal pathways to obesity

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Abstract

Background: Longitudinal studies have implicated both marital distress and depression in the development of the metabolic syndrome, a risk factor for diabetes and cardiovascular disease. This study addressed the impact of hostile marital interactions and a mood disorder history on obesity-related metabolic responses to high-fat meals.

Methods: This double-blind, randomized crossover study included serial assessments of resting energy expenditure (REE), fat and carbohydrate oxidation, triglycerides, insulin, glucose, interleukin 6 (IL-6), and tumor necrosis factor alpha (TNF- α) before and after two high-fat meals. During two separate 9.5 h visits, 43 healthy married couples, ages 24–61 (mean = 38.22), received either a high saturated fat meal or a high oleic sunflower oil meal, both 930 kcal and 60 g fat. The Structured Diagnostic Interview for DSM-IV assessed mood disorder history. Couples discussed a marital disagreement during both visits; behavioral coding of these interactions provided data on hostile marital behaviors.

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Results: Men and women who displayed more hostile behaviors and who also had a mood disorder history had significantly lower post-meal REE, higher insulin, and higher peak triglyceride responses than other participants, with nonsignificant effects for fat and carbohydrate oxidation. Participants with a mood disorder history had a steeper rise in postprandial IL-6 and glucose than those without a past history. Higher levels of hostile behaviors were associated with higher post-meal TNF- α . The two meals did not differ on any outcome assessed.

Conclusions: People spend about 18 of every 24 h in a postprandial state, and dining with one's partner is a common daily event. Among subjects with a mood disorder history, the cumulative 6.75-h difference between high and low hostile behaviors translates into 128 kcal, a difference that could add 7.6 pounds/year. Our findings illustrate novel pathways through which chronic marital stress and a mood disorder history synergistically heighten the risk for obesity, metabolic syndrome, and cardiovascular disease.

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1. Introduction

A turbulent marriage can have a substantial impact, including a three-fold heightened risk for serious coronary events and a three-fold increased likelihood of developing metabolic syndrome (Orth-Gomer et al., 2000; Troxel et al., 2005). Troubled marriages also take a toll on mental health (Rehman et al., 2008; Beach, 2014); for example, unhappy marriages are a potent risk factor for major depressive disorder, associated with a 25-fold increase relative to untroubled marriages (Weissman, 1987).

The amplified risk for depression in distressed marriages is important because depression and chronic stress promote obesity (Raikkonen et al., 2007; Luppino et al., 2010), which contributes to a host of medical problems, including cardiovascular disease, diabetes, and metabolic syndrome. Indeed, depressed people have a 58% increased risk of becoming obese (Luppino et al., 2010). In a large prospective study, older depressed adults gained visceral fat over 5 years, while nondepressed adults lost visceral fat (Vogelzangs et al., 2008). Longitudinal studies have implicated both depression and marital discord in the development of the metabolic syndrome, which has abdominal obesity as its cornerstone (Troxel et al., 2005; Whisman et al., 2010; Pan et al., 2012; Whisman and Uebelacker, 2012).

During stressful times many people turn to calorie-dense high-fat "comfort" food (Tomiyama et al., 2011), while others may eat less (Dallman, 2010). Rodent studies have shown that stressors can alter energy expenditure as well as fat and carbohydrate metabolism (Moles et al., 2006; Laugero, 2008; Dallman, 2010), and these changes could provide another route to obesity—particularly if they occurred when people were turning to comfort foods.

In accord with the rodent data, we recently demonstrated that greater numbers of prior daily stressors were associated with obesity-promoting metabolic responses to high-fat meals the following day, including lower post-meal resting energy expenditure, lower fat oxidation, and higher insulin (Kiecolt-Glaser et al., 2014). Furthermore, women with a history of depression who also had experienced more prior day stressors had a higher peak postprandial triglyceride response than other participants (Kiecolt-Glaser et al., 2014).

The current study extends our prior work in several notable ways. The average age of the 58 participants in our first study was 53, all were women, and two-thirds were breast cancer survivors (Kiecolt-Glaser et al., 2014) and thus the generalizability of our findings was unclear. Furthermore, in our prior study stressors were self-reported whereas the current study included observational data from two marital interactions.

This study provided the opportunity to examine the impact of an acute stressor, marital conflict, on healthy men and women's metabolic responses to high-fat meals. Higher levels of hostile and negative behavior during marital conflict discussions are strongly related to lower marital satisfaction, a consistent finding in the marital literature (Robles et al., 2014). However, our primary focus was on hostile behavior rather than self-reported satisfaction because of the evidence that objectively measured marital behaviors explain more of the variance in physiological outcomes (Kiecolt-Glaser and Newton, 2001). Based on this rationale, we assessed the joint impact of hostile marital behavior and a mood disorder history on post-meal responses.

Metabolic processes that influence weight regulation and fat storage were our central focus. Resting energy expenditure plays a key role in energy balance and weight control, accounting for 65–75% of the total daily energy expenditure; lower daily energy expenditure increases risk for weight gain (Lara et al., 2010). Metabolism of macronutrients, primarily fats and carbohydrates, also influences weight regulation (Flatt, 2012), and lower fat oxidation clearly facilitates weight gain over time (Blaak et al., 2006). Higher levels of insulin stimulate food intake and visceral fat accumulation (Dallman, 2010). Triglycerides are the major form of fat storage in the body. Acute stress can transiently increase triglyceride concentrations and slow triglyceride clearance (Stoney et al., 2002). The magnitude and duration of the postprandial triglyceride response is linked with the progression of atherosclerosis (Boquist et al., 1999; Teno et al., 2000; Pollin et al., 2008).

Earlier dietary studies suggested that ingestion of high-fat meals raises systemic inflammatory responses, with high saturated fat meals in particular promoting greater or more sustained inflammatory responses (Nappo et al., 2002). Accordingly we contrasted a meal high in saturated fatty acids with a meal high in monounsaturated fatty acids, and

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